Observations on the value of subcutaneous injections of milk in the treatment of certain diseases and injuries of the eye.

Thesis for the Degree of M. D., presented by

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In 1921 I had to stay in Cadiz for three months waiting to be examined for a Spanish degree and while attending the hospital attached to the school of Medicine there, I was struck by the crowds of patients under treatment for diseases of the eye. The professor in charge of the eye clinic, told me that the number of people in the districts round Cadiz suffering from ophthalmic affections was appalling. In addition to the usual causes which increase the prevalence of eye diseases in a sub-tropical country (e.g.- heat, bright sunlight, dust, high winds, and general want of hygiene) half the population were suffering from trachoma. Under these conditions it is needless to say that the amount of material available for study was quite large and having plenty time at my disposal, I was able to compare the results of different methods of treatment. Here for the first time I saw milk used in subcutaneous injection and in some conditions, the results were simply surprising .

In my practice in Teneriffe, I get a considerable number of eye cases to treat and on my return home, injections of milk were used as a routine in what were considered appropriate cases. These observations were continued from December 1921 up to January 1926 when 315 cases had been treated for ___ Ulcerations of the cornea, acute and subacute keratitis.

continued

Iritis and iridocyclitis.

Infected wounds of eye.

Also prophylactic injections were always given immediately in any severe injury . In milder cases appropriate local treatment was used,under observation, and injections were given if progress was not satisfactory. I have made a selection and given the notes of a few cases in each class. Naturally they have been mostly chosen on account of the gravity of the condition treated and if compared with the real results obtained by other treatment, show clearly the advantage of using the injections of milk in the diseases above mentioned.

The three cases, Nos 6, 7, 19, are the opposite of the others, and have been chosen as examples of how rapid and complete the cure may be in benign cases.

With respect to prophylactic injections, as surgeon to three firms who grow and export bananas, I have to look after about fifteen hundred workers.Among the accidents which happen to them, injury of the eye is quite common, especially in the packing sheds where the women sit all day nailing crates by hand and injury to the eye is frequently due to splinters and flying nails.(See case 30.)

Among those working in the plantations, the injuries as a rule are slight,mostly scratches from leaves and punctures from thorns, but as in this country wounds infect very readily, a small scratch if not promptly treated may be converted in a couple of days

continued

into a huge corneal ulcer with hypopyon. The Spanish law of accidents obliges the employer immediately to send to a doctor any worker who has received an injury however slight. In this way I have had a fair opportunity of observing the value of milk injection as a prophylactic against infection of injuries of the eye and the result has been invariably satisfactory.

MODE OF ACTION.

Milk by subcutaneous injection is non-irritant to the tissues, which fact may be observed if the subconjunctival route has been used. The absorption is complete in six or seven hours and no chemosis or redness is left. The routine interval I have always used is 48 hours. The injections have usually been given in the early forenoon, and the rule is that the patient gets relief from the pain during the afternoon, passes a good night, but during the second night following the first injection, there may be a return of the pain in a more or less degree. With the second injection this pain goes, and in ninety nine cases out of a hundred, does not return. Case-13. From the above observation I have supposed that the elimination has been completed and physiological action finished well within the 48 hours: say 36 to 40 hours. I have seen no reason however to shorten the routine interval as it has worked very satisfactorily in all the cases in which I have used it . A rare exception to this might be, that on finding no improvement after the first injection, a second would be given in 24 hours, the subsequent injection being continued with the 48 hours interval . In fact, the improvement noted after the first injection is so certain, that I have not found it necessary to give another in 24 hours,

more than twice in over three hundred cases. In from four to six hours after the first injection there is a rise of temperature which is invariably in proportion to the quantity of milk injected.

In the adult - 2.c.c. give about 37°.5.
3.c.c. " " 38°.
4.c.c. " " 39°.

In spite of this fever, the general comfort of the patient is very slightly affected. The appetite remains good, the tongue clean and moist and the only other thing which may be noticed is a tendency to sleep. If larger doses are used, the febrile reaction may be quite violent and the temperature rise to over 40°. I have seen one case of nearly 41°. due to a first injection of 6.c.c. Four hours after injection, there was severe shivering and sickness, and the temperature rapidly rose; the patient feeling very ill. It quickly passed off, as at the end of twelve hours the temperature had fallen to 37°.3. Though there is no doubt that the therapeutic effect of the injections is more satisfactory if there is a distinct rise of temperature, I do not think that any better results are got by reactions over 39°. than what are obtained rapidly and easily by reaction round about 38°. to 38°.5. As these latter reactions cause practically no discomfort, it is needless to refer further to the advantage of not exceeding the doses indicated. The above remarks apply more particularly to the first and maybe, to the second injection. In those the reaction is usually well marked. Afterwards keeping always to the initial dose the rise of temperature rarely exceeds 37°.5.

The therapeutic action of milk injected subcuta -neously is prophylactic as well as curative. The prophylactic action is not so easy to demonstrate as the curative, but exists to a very high degree when dealing with recent injuries of the eye. The curative action is most extraordinary when it is used in the treatment of localised septic inflamma--tions of the eye and really can only be compared to the power of antidiphtheritic serum in curing diphtheria itself. It is impossible to prove that the action of milk in diseases of the eye is more rapid than that of the serum in diphtheria ,but in any case the beneficial effect is apparent in a very few hours and the ~~apin~~ pain is often relieved as if by morphia. This striking result is evidently brought about by the absorption of exudates which were pressing on the nerve endings. Weichardt says in an article titled " Non-specific activations of proto--plasm" __ " In an organism previously sensitised by infection, the non-specific stimulation may result in a higher degree of utilisation of all protective processes and may in part be shown by a well marked local reaction in the diseased tissues."
This appears to be in accordance with what can be observed in ulcers of the cornea and keratitis.
A few hours after injection there is dilatation of vessels and increased rapidity of local circulation in which the general fever also assists. This means

more phagocytosis and a rapid cleaning up of the ulcer. The reparative processes in the borders of the ulcer are also stimulated. Very quickly in keratitis, tiny vessels may be observed in the deeper layers of the cornea. Some of these vessels may be new and others may be dilated preexisting vessels, but in any case the rate of absorption of exudates is increased in proportion to the heightened local circulation. This local action of the injection, in great part only mechanical, is in my opinion the most important one, though the increased general leucocytosis helps later on in destroying the infection.

The fact that the diseases and injuries of the eye under consideration, are all types of a localised septic inflammation, probably accounts for the extraordinary success of treatment by milk injection. This treatment is useless in synechias or chronic affections of the retina and optic nerve.

TECHNIQUE.

(1) The technique is very simple and the following points have to be noted. Viz:

(1) The milk (2) site of injection (3) quantity to be injected (4) interval between injections (5)number of injections to be given.

(1) Any kind of milk may be used (cow,goat or sheep) and it is needless to say that measures be taken to insure that the animal is healthy.The milk ought to be fresh,sterilised at once,filtered through gauze and used as soon as possible.The milk ought not to be boiled but heated to about 185.F. for an hour. There is no necessity for any complicated apparatus.All that is required is a small steriliser such as is used for boiling instruments:two small Florence flasks: a small strip of gauze bandage: a little cotton wool and a forceps. Here is Teneriffe I have always used goats milk. 30.c.c. are put in one of the flasks and in the other flask an equal quantity of water. Both are plugged with cotton wool.The steriliser is half filled with water into which is also put the strip of gauze and the forceps.The steriliser is then heated to boiling point and kept so for an hour adding a little water from time to time;as the water evaporates,it is better always to keep the water in the steriliser at a slightly higher level than the milk in the flask. At the end of an hour the milk is decanted into the other flask which has

been emptied of the water.Before pouring in the milk,cover the mouth of flask with the piece of gauze doubled.Use the forceps for all manipulations of gauze etc. In this simple way the milk is sterilised, and filtered into another flask also sterilised. Two needles are used. Along one for charging syringe from the flask and an ordinary size hypodermic needle for giving injection.

(2) The best site is in the peri-scapular region , injecting in free subcutaneous cellular tissue. The injection may also be given in the abdominal wall always taking care that it is subcutaneous. If the injections are given with all ordinary aseptic precautions there is no tendency to inflame much less suppurate. The injections are not painful but in using the maximum doses recommended(4.c.c.) there may be a slight tenderness for a few hours at the site of injection. The smaller doses do not cause any discomfort whatever. In some few cases the subconjunctival route may be used(case 4) Intravenous injections ought not to be used. In ophthalmic practice there is rarely danger to life and in any case the effect obtained by subcutaneous injection is so extremely rapid,that there is no advantage in using a method which in my opinion is dangerous.

(3) The dose in adults is from 3 to 4 c.c.(maximum) 16 to 75 years.

2 c.c.(maximum) 10 to 16 years.

1 1/2 c. c. (maximum) 5 to 10 years,

continued

1 c.c. (maximum) 1 to 5 years.

1/2 to 1/4 c.c.(maximum) under a year.

Over 75 years the dose ought to be reduced.

If the subconjunstival route is used the dose may be up to 1/2 c.c. in adult; others are given a less dose in proportion to age.

(4) The routine interval used has been every 48 hours. In one or two cases on account of very little improvement having been noticed after the first injection, a second injection has been given in 24 hours but any susequent injections were given with the usual 48 hours interval.

(5) The number of injections required may be from two to six. It is not necessary to give more than six, as if the desired effect has not been obtained by the sixth injection, it is useless to continue the treatment. It would do no harm to give more. I made the experiment by giving twelve consecutive injections with the 48 hours interval and I was convinced that the full effects are obtained by the fifth or sixth injection, and that afterwards the cure can be completed by appropriate local and general treatment.

Ulcerations of the cornea.

Case 1.

Carlos F. A. 26 years. 1.st. consult. 13.th. Jan. 1922.

Present condition: Ulcer of left cornea(pneumococcus) following on an old trachoma. Iritis present in moderate degree.

History : The ulceration began about seven days ago, but for the last two days has got very much worse and he is suffering great pain in the eye. Vision - O.

Treatment : Atropine and bandage. An injection of 3.c.c. of milk was given on this date (13.th. Jan. 1922.)

14.th. Jan. Has slept all night without the least pain: the ulcer looks more healthy.

15.th. " 2.nd. injection of milk.

17.th. " 3.rd. " " " .

19.th. " 4.th. " " " .

21.st. " 5.th. " " " .Today the eye was left unbandanged.

23/rd. " 6.th. injection. Iritis almost cured and ulcer is healing.

12,th.Feb. 1922. The ulcer continued improving from day to day till on this date the ulcer was healed. No corneal scar was left and vision is normal.

Case 2

Maria C. A. 8 years. 1·st. consult.
8·th.July 1925.

Present condition: Ulcer of right cornea with slight hypopyon during treatment of a pleural empyema.

Treatment : Atropine: Quinine Hydrochlor: Methylene blue:+ injection of milk 2.cc.

9·th. July. Notable improvement.

10·th. 2·nd. injection.

11·th. Ulcer is being rapidly covered by epithelium.The hypopyon has gone.

12·th. 3·rd. injection.

13·th. 4·th. " .Ulcer is healed leaving a deep infiltration of the cornea but not very dense.

15·th. 5·th. injection.The infiltration is gradually being absorbed.

17·th. 6·th. injection.

19·th. The infiltration of cornea has been completely absorbed: there is no leucoma and vision is normal.

4·th. Aug.1925.

Case 3.

Juan R. A. 5 years. 1·st.consult.

3·rd.Oct. 1923.

Present condition: Extensive ulceration of right cornea, peripheric and with imminent danger of perforation. (pneumococcus.)

Treatment: Bathing with isotonic saline and

3·rd. Oct. 1 st. injection milk. 1.50.c.c.

4·th. " Great improvement.

5·th. " 2·nd. injection

6·th. " Improvement continues.

7·th. " 3·rd. injection.

9·th. " Ulcer is healed leaving very slight infiltration of cornea and with normal vision.

15·th. " Discharged cured.

Case 4.

Guillermo P. A. 47 years. 1.st. consult.

26.th.July.1924

Present history: Serpiginous ulcer of left eye, deep and extensive. Is suffering very severe pain from present irido-cyclitis complicating ulcer. The cause of ulceration is supposed to have been a piece of chaff which was embedded under the upper eyelid. He has an atrophied right eye and old lachrymal stenosis. Vision - O.

Treatment: Irrigation of eye with isotonic saline followed by collyrium of

26th. July dionine + methylene blue. Eye was also bandaged lightly and 1.st. injection 3.c.c. of milk.

27.th. " He says he has had a better night. The pains are less and ulcer is cleaning, both borders and base.

28.th. " 2.nd. injection.

"

29.th. Ulcer is much smaller: he has no pain and can see the hand passed in front of his eyes.

30.th. " 3.rd. injection. Ulcer is covered by epithelium and he can distinguish fingers at six inches.

1.st. Aug.1924. 4.th. injection.

3.rd. " 5.th. injection. Has had a relapse

as the ulcer does not appear to be in such a satisfactory condition. There is no apparent reason for this.

4·th. Aug. Is no better.

5·th. " 6·th. injection.

6·th. " The cornea is in the same condition and patient complains of a good deal of pain.

7·th. " A subconjunctival injection of $\frac{2}{10}$ c.c. of milk was given in the morning. In the afternoon was much better especially as regards to the pain.

8·th. " Cornea is clearer and patient volunteers the statement that he feels much better.

9·th. " 2·nd. subconjunctival injection. 1/2 c.c.

10·th. " Pain is entirely gone and vision is clearer.

12·th. " 3·rd. subconjunctival injection 1/2 c.c. continues improving on the

3·rd. Sept. 1924. was discharged with a small external leucoma: centre free and vision good.

Case 5.

Pedro S. A. 2 years 1·st. consult.

18·th.Oct. 1922.

Present condition: Conjunctivitis with keratitis. Very slight superficial ulceration. History of about a month. Origin of infection was impetigo of nose and ear.

Treatment: Atropine + Ung. ox.Hydrarg.Flav.

18·th. Oct. and an injection of 1.c.c. milk.

19·th. " Photophobia is less: pupil is dilated and the cornea is more transparent.

20·th. " 2·nd. injection of milk and continues improving.

22·nd. " 3·rd. injection of milk.

24·th. " 4·th. " " " .

26·th. " 5·th. " " " .

27·th. " Photophobia and conjunctival secretion have disappeared . The corneal infiltration slowly cleared up and patient was discharged with a transparent cornea on the 6·th. November.1922.

Case 6.

Maria G. A. 12 years. 1.st. consult.
5.th.April.1923.

Present condition : Conjunctivitis of left eye(two small ulcers) complicated by iritis.Is suffering great pain. The cause of infection as in the previous case was impetigo of the nose.

Treatment; Hot formentations + atropine and dionine collyrium.

5.th. April 1 st. injection of 2.c.c. of milk.
6.th. " Pupil dilated,pain gone and she slept all night.
7.th. " 2.nd. injection given.
8.th. " Ulcers are healed and condition of eye was so satisfactory that no more injections were necessary. Patient continued treatment at
21.st. " home and reported herself in a fortnight when the eye was found completely cured.

Case 7

Petra L. A. 8 years. 1.st. consult.

10.th.Feb.1925.

Present condition: Left eye: Conjunctivitis with small ulcer of cornea and keratitis. Probably due to infection from a patch of acute eczema of left cheek.

Treatment:

10.th. Feb. Injection milk 2.c.c.

12.th. " 2.nd. injection.Ulcer is practically healed and conjunctivitis is improving.

14.th. " Discharged cured with clear cornea.

Case 8

Lucia H. A. 3 years. 1.st. consult.

8.th. Dec. 1924.

Present condition: Keratitis with infected ulcer of right cornea the probable cause of infection being impetigo of face. The child is suffering great pain and has intense photophobia.

Treatment: Atropine and methylene blue t.i.d

8.th. Dec. 1.st. injection milk 1.c.c.

9.th. " Ulcer is cleaner: pupil slightly dilated: child slept all night.

10.th. " 2.nd. injection 1.c.c.

11.th. " Very marked improvement .

12.th. " 3.rd. injection.

13.th. " There has been no return of pain: ulcer is covered with epithelium and pupil fully dilated. The child can now open its eyes in a half light.

14.th. " 4.th. injection.

16.th. " 5.th. injection.

17.th. " Ulcer is completely healed leaving a slight infiltration of cornea. She can open her eye widely in the light of an ordinary room.

The convalescence was uninterrupted and the infiltration of cornea was gradually absorbed and on her discharge on the 30.th. Dec. there was nothing left but an almost imperceptible nebula.

Case 9

Maria B. A. 13 years 1.st. consult.
3.rd. May 1923

Present condition: Severe conjunctivitis with ulcerative keratitis of both eyes: History of about eight months illness. General health is very poor and she has no vision in right eye and practically none in left. Has been under treatment by other doctors without result.

Treatment: Irrigation of eyes with isotonic saline, Atropine (Collyrium) and dionine 1 % and bandaging of both eyes to minimise risk of perforation of cornea.

4.th. May 1 st. injection 2.c.c. milk

5.th. " Improvement is marvellous. The corneas are clearing and it is possible to see the pupils.

6.th. " 2.nd. injection.

7.th. " The conditions have completely changed: the ulcers of right cornea are healed and the left cornea has cleared up to an ordinary degree.

8.th. " 3.rd. injection.

10.th. " 4.th. injection. Cornea continues gaining in transparency and the interstitial exudations have been absorbed almost completely.

(continued)

12·th. May	5·th. injection.
14·th. "	6·th. injection.
15·th. "	Vision left eye = counts fingers at ten feet. Vision right eye = counts fingers at one foot.
27·th. "	Left cornea clear without cicatrix. Right cornea has a dense central leucoma which only gives a very limited vision.
17·th.June	Was discharged on this date with 1/6 right and 6/6 left.

Case 10.

Gregoria V. A. 53 years 1.st. consult.

17.th.Oct. 1924.

Present condition: Almost total destruction of both corneas with prolapse of iris and large hypopyon in right eye. Probable infection from an extensive eczema of the face.

Treatment: Irrigation with isotonic saline. Collyrium Eserine + methylene blue with bandaging of both eyes.

17.th. Oct. 1 st. injection 3.c.c. milk.

18.th. " Has passed a good night.The ulcers are reduced to half the size they were:the hypopyon has almost disappeared and she can count fingers with the left eye.

19.th. 2.nd. injection.

20.th. The left cornea is transparent except for a slight opacity in the inferior nasal quadrant.

21.st. 3.rd. injection.Improving rapidly.

23.rd. 4.th. injection.

24.th. Has more vision in right eye and with left eye can just distinguish fingers.

25.th. 5.th. injection.

26.th. Left cornea completely transparent and in the right eye it is possible to see the pupil.

continued.

27·th.Oct. 6·th. injection.

1·st.Nov. 1924 Left eye is cured with normal vision.Right eye which had a prolapse of iris slowly improved and was left with vision 3/6 when

4·th.Dec. 1924. she was discharged.

Case 11

Josefa B. A. 56 years 1·st. consult.

5·th.April·1922.

Present condition: Extensive serpiginous ulcer of right cornea, central and with suppurating dacryocystitis .The left eye is atrophied from an old lesion.She is suffering severe periorbital pains and vision of eye is reduced to the bare percep--tion of light.

Treatment: Quin. Hydrochlor. dionine+methy--lene blue.(Collyrium)

9·th. April 1 st. injection 3.c.c.(9 a.m.) and by afternoon the pains are relieved and the general appearance of the eye is better.

11·th. " 2·nd. injection.Improvement con--tinues.Pain has quite gone.

13·th. " 3 rd. injection.

14·th. " The cornea is clearer and she can distinguish fingers at six inches, with her back to the light.

16 th. " The ulcer is healed but the deeper layers of cornea are greatly infil--trated.

20·th. " This infiltration was slowly absorbed till on the date of her discharge on the

24·th.May 1922. it has disappeared leaving her with quite satisfactory vision.

Case 12

Inez. B. A. 24 years 1.st. consult.

6·th.Sept. 1924.

Present condition: Ulceration of nearly the whole of the left cornea, trichiasis and pneumococcal infection.Obstruction of lachrymal ducts.The right eye is completely lost(staphyloma.) through a previous attack of ulceration with sclero-chorioi--ditis.Present attack began eleven days ago.She is suffering violent pain and cannot sleep: her general state is deplorable due to her natural fear of losing the sight of her only eye.

Treatment: Irrigation of eye with isotonic saline. Collyrudm Quin.Hydrochlor 1% + Dionine 2 % .Eye closely bandaged.

6·th.Sept.1924. 1·st. injection. 3.c.c.(9 a.m.) in the afternoon temp.38°.1. and she says she has less pain.

7·th. " Has had a bad night and the eye is no better.

8·th. " 2 nd. injection 3.c.c. Afternoon temp. 37°.8.

10·th. " 3 rd. injection.Afternoon temp.37°.6. Pain has disappeared.

11·th. " Has slept and general condition of

eye is better.

13·th.Sept.1924. Ulcer has cleared up and is beginning to heal.No more injections were given but the local treatment was continued until her discharge on the 27·th.Oct. with a slight central opacity of cornea and good vision.She returns in a fortnight for the operation for entropion of the upper eyelid and on examination two months after, the opacity above referred to had disappeared.

Case 13.

Juana A. A. 30 years. 1.st. consult.

18.June.1924.

Present condition: Central serpiginous ulceration of left cornea:the borders of ulcer are infiltrated and purulent. Hypopyon 1/3. Is suffering from severe periorbital pain which is worse at night.History is of four--teen days and she is unaware of having received any injury. Has purulent dacryocystitis .

Treatment: 1.st. injection milk 3.c.c. at

18.th. June 1924. 10 a.m. Patient was seen in the late afternoon of the same day-. The cornea and anterior chamber were more transparent,the ulcer was cleaner and the pains were much less.

19.th. " The hypopyon has disappeared:she has had no pain during the night: the pupil is dilated to maximum.

20.th. " Condition of eye is not so good as yesterday:there has been a slight return of hypopyon and also some pain during the night.

2.nd. injection was given.

21.st. " Has slept all night:has had no pain.

22.nd. " 3.rd.injection.Improvement continues

24.th. " 4.th.injection.Ulcer almost free from pus.

continued

26.th.June 1924. 5.th. injection.There is no purulent discharge from the lachrymal ducts which are slightly permeable: the corneal ulcer has healed leaving a slight infiltration in the deeper corneal layers.

28.th. " 6.th.injection.

6.th.July 1924. Was discharged on this date with good vision and the corneal infiltration clearing up.

Case 14.

Elisio C. A. 47 years

1. st. consult.

17. th. March. 1925.

Present condition: Recent (4 days) serpiginous ulcer centre of right cornea with small hypopyon, iritis and obstruction of lachrymal duct. He is suffering great pain.

Treatment: Atropine and

17. th. March 1. st. injection 3.c.c.

19. th. " There is great improvement. Pain is less: hypopyon has disappeared and ulcer is rapidly being covered with epithelium. 2. nd. injection.

20. th. " Pain completely gone.

27. th. " Patient is perfectly well with normal vision and no corneal cicatrix.

Case 15.

Concepción M. A. 58 years 1·st. consult.

8·th.Sept. 1925.

Present condition: Serpiginous ulcer occupying almost the whole of the right cornea: hypopyon 1/2: there is an old dacryocystitis:no vision :severe periorbital pain.

Treatment: As she had been under treatment by other doctors for about a fortnight and there was no improvement in spite of the local treatment usually employed in those cases, in order to compare results , injections of milk were given without any local treatment whatever.

8·th. Sept. 1·st. injection 3.c.c.The temp. rose that night to 38°.3. and she passed the night with considerably less pain.

9·th. " The condition of the eye has improved to a marvellous degree: hypopyon reduced in size : the pericorneal injection is less and the ulcer is cleaner.

10·th. " 2·nd. injection:the improvement continues and the pains have almost completely disappeared.

continued

11·th.Sept.	Hypopyon has been absorbed. Ulcer is beginning to be covered with epithelium :patient has slept all night without pain.Temp. 37°.
12·th. "	3·rd. injection:the condition of eye is very satisfactory: ulcer is healing rapidly. Up to this date no local treatment was used,but today a collyrium of eserine was ordered with a light bandaging to correct a threatened staphyloma.
14·th. "	4·th. injection: Eserine once a day with bandage.
21·st. "	Ulcer continues healing slowly and she was discharged on the
1·st.Oct. 1925	with instructions to continue the bandage for some time as the scar was rather weak. Vision about 3/6

Case 16.

Adela P. A. 23 years 1·st. consult.

12·th.April 1924.

Present condition: Serpiginous ulcer left cornea in the supero-nasal quadrant, marked hypopyon, and iridocyclitis with severe pain especially at night.

12·th.April At the moment, this patient was unable to return daily for observation and treatment, so she was sent home to carry on a treatment of hot fomentations and collyrium of Quin. Hydrochlor + Atropine.

18·th. " Patient returned on this date. The ulcer has not increased in extension but is deeper. The hypopyon continues the same. The pupil is fully dilated. The tension of the eye is diminished. The iridocylitis continues the same and she complains of excruciating pain in the eye. In view of the fact that there had been no improvement, the atropine and quinine were stopped and the eye was simply bathed twice daily with an isotonic saline solution and dark glasses were ordered. She was immediately sent into hospital and on that same morning 18. th. April was given 1. st. injection 3. c. c. She was

continued

visited in the afternoon and she stated that the pains had gone. Temp. 38°.8. and the improvement in the eye is extraordinary. The ulcer has a healthier appearance: there is hardly a vestige of the hypopyon : the photo--phobia and injection of sclerotic vessels are considerably diminished.

19·th. April The patient has had a quiet night without pain: the hypopyon has dis--appeared: very slight pericorneal injection left: pupil in semidilation: Temp. 38°.

20,th. " Pain has returned to a certain degree but condition of ulcer is satisfactory Temperature normal. 2·nd. injection given

21,st. " Had a good night; no pain.

22·nd. " 3·rd. injection. Temp. afternoon 38°.1.

23·rd. " Pain has completely gone.

24·th. " 4·th. injection.

26·th. " 5·th. injection. Improvement continues without interruption and patient was discharged on 1·st. May 1924 with no leucoma and normal vision.

Case 17

Gaspar G. A. 22 years 1-st.consult.

14-th.Sept.1922.

Present condition: Corneal ulcer(pneumococcus.) caused by infection of small wound of cornea(scratched by a maize leaf.) Has periorbital pains worse at night.

Treatment: Collyrium Quin.Hydrochlor. and atropine.

14-th. Sept. "

21-st. " Returned in the same condition without the least improvement in the eye and the pains are just as severe.There is a deep ulceration in the supero-nasal quadrant:pupil is fully dilated.Pain is probably reflex from the ciliary body not simply from the iris. 1-st. injection 3.c.c.

22-nd. " Pain has almost disappeared:the condition of ulcer is better and there is less pericorneal injection

23-rd. " Improvement continues and 2-nd. injection was given.

24-th. " Ulcer is reduced to the size of a pin's head: pain,photophobia and pericorneal injection have all gone

25-th. " 3-rd. injection.

29-th. " Patient discharged completely cured without leucoma.

Case 18.

Juana R. A. 55 years. 1·st. consult.

15·th.Feb. 1923.

Present condition: Chronic dacryocystitis of many years duration and about twenty days ago began to suffer severe pain in left eye.On examination there was an extensive ulceration of nearly the whole of the cornea with imminent danger of prolapse of iris.

Treatment:

16·th. Feb. 1·st.injection 3.c.c. and simply light compression of eye with a bandage.

18·th. " 2·nd.injection.Eye is better. Suppuration from lachrymal sac is less.

20·th. " 3·rd.injection.Pain has gone and there is no pus from ulcer or sac.

22·nd. " 4·th.injection.

23·rd. " Improvement continues.Ulcer is healed leaving a flat cicatrix semitransparent.There are marked signs of atrophy of the eyeball. Although the above condition was left,still the infection was cured in a fortnight and the eye was saved though with reduced vision.At first it seemed almost impossible that anything at all could be done with the eye.

Case 19.

Maria L. A. 38 years. 1·st. consult.

26·th. Oct. 1925.

Present condition: Central ulcer of cornea compli-
-cated by iritis. Cause unknown.

Treatment:

26·th. Oct.	1·st. injection + Atropine.
28·th. "	2·nd. injection "
30·th. "	3·rd. injection. Atropine stopped.
4·th. Nov.	Discharged completely cured in seven days.

VARIOUS DISEASES OF CORNEA.

Case 20.

Francisco M. A. 11 months. 1. st. consult.

30. th. July. 1924.

Present condition: Extensive ulceration of left cornea and to a less degree of right cornea due to a double diphtheritic conjunctivitis.

Treatment : 10 .c.c. antidiphtheritic serum on three successive days.

1 st. Aug. 3 rd. injection of serum was given On this date the great swelling had subsided and the lids could be freely separated for examination. There was a free discharge of purulent matter and the condition of corneas was as above noted.

2 nd. " No more serum was given. Eyes were irrigated with isotonic saline + collyrium methylene blue 1/2 %

8. th. " Eyes are certainly better but improvement is very slow. Decided to try milk injections.

~~8. th. "~~ 1. st. injection 1.c.c.

10 th. " 2. nd. " 1.c.c.

12 th. " 3. rd. " 1.c.c. There is less infiltration of cornea and there is very little discharge.

13. th. " Infiltration less though naturally there is still left a certain

amount of central ulceration more in left eye than in right.

14·th. Aug. 4·th. injection 1.c.c. Ulcers are rapidly healing.

16·th. " 5·th. injection 1.c.c. Ulcers are covered with epithylium and on

18·th. " there was only a slight central leucoma in each eye. No more injections.

23·rd. " Patient was discharged on this date to return in 15 days, the following treatment to be carried out. Collyrium atropine every 2 nd. day and ung. Hydrarg. Ox. Flav. every night in both eyes.

7·th. Sept. Leucomas improved. Atropine stopped. Ointment to be continued every night for a month.

10·th. " Leucomas are imperceptible. The baby appears to have good vision though on account of its age an exact test is impossible. Treatment stopped.

HERPES OF THE CORNEA.

Case 21

Feliciano Q. A. 23 years 1-st. consult.
4-th. Jan. 1924.

Present condition: Central herpetic ulcer with anaesthesia of left cornea . Probably caused by an attack of influenza ten days previously (there was an epidemic of influenza raging at the time.)

Treatment:

4-th. Jan.	1 st.injection 3.c.c. was given + atropine
6-th. "	2 nd. injection,great improvement
7.th. "	Ulcer is beginning to be covered with epithelium.
8-th. "	3 rd. injection.Atropine stopped.
10-th. "	4 th. injection.Healing of ulcer continues.
24-th. "	Discharged cured without cicatrix.

Case 22.

Juan O. A. 43 years. 1.st. consult.
5.th.Oct. 1924.

Present condition: Supraorbital herpes with a superficial central ulcer of right cornea.History of three days photophobia and pain. Ulcer was not infected.

Treatment: Dark room and the

5'th. Oct.1924 1 st.injection 3.c.c. of milk.

7.th. " 2 nd.injection.Photophobia is less there is no pain and ulcer is healing rapidly.

9.th. " 3 rd.injection.Improvement continues though there is still some photophobia.

13.th. " Discharged cured with eye perfectly normal.

Note: This case was under treatment within three days and there was no secondary infection of ulcer which explains the rapidity of the cure. Under the customary local treatment the true herpetic ulcer is sometimes very troublesome to heal. Partly on account of its depth and complete destruction of superficial tissues it may leave a flattened scar with irregular astigmatism. If this scar is

continued

central it may interfere greatly with vision even though it is perfectly transparent. The case which follows this was the contrary and shows the disability which may be left after such an ulceration with secondary infection, which has not been promptly treated.

Case 23

Aquilino S, A, 26 years — 1.st. consult.

18.th.March 1925

Present condition:

18.th. March — Herpetic ulceration of right cornea.Ulcer is superficial but very extensive.History of about a week.There is photophobia,extreme pericorneal injection,anaesthesia of ulcer,pin point pupil,infil--tration of iris,turbid aqueous humour and vision nil.This patient was extremely dirty and it was impossible to find out what was the exact cause of his condition. He lived at a distance and wanted to go home.The danger of this was pointed out to him and he appeared to agree but instead of coming back in the afternoon to get his eye attended to,he sent a message that he had gone home but would return immediately.

24.th. March — It was a week later on this date that he turned up, and then his condition was deplorable. He was suffering excruciating pain,the ulcer was infected,the borders full of pus, the anterior chamber was half filled by a hypopyon. The condition of the iris could not be ascertained.

continued

Treatment:

24·th. March — Quin. Hydrochlor + Atropine collyrium thrice daily. Intravenous injection of Hydrarg. Cyan. on alternate days. After six days of the above treat-ment there was no improvement. On

30·th. " — this date an injection of 3.c.c. of milk was given

31·st. " — Had a fair night: pain is less

1·st. April — 2.nd. injection. Ulcer is cleaner and hypopyon is 1/3.

3·rd. " — 3·rd. injection: no pain : hypopyon has been absorbed. It is now possible to see the pupil which in spite of the atropine is contracted to a pin point

5·th. " — The ulcer is almost completely covered by epithelium but deeply in-filtrated in the centre. The pupil has dilated in the temporal half. The ulceration was mostly in the nasal half of iris where there are posterior synechias.

7·th. " — 5·th. injection.

9·th. " — 6·th. injection: improvement continues

14·th. " — Cornea is transparent: pupil is dilat-ed temporal half. Synechias nasal half. There is no pain or photophobia and he can distinguish fingers at 5 metres. Was discharged with above on May 8'th. 1925.

INTERSTITIAL KERATITIS. Case 24

Maria R. A. 13 years 1·st.consult.

4·th. Jan.1926.

Present condition: Interstitial keratitis of left eye Infection undetermined but was probably due to influenza as the constitution of the patient is excellent and she has always en--joyed good health.About a month before had an attack of influenza (epidemic at the time). She was confined to bed for a fortnight with first respiratory and later on gastric symptoms. During her convalescence the eye began to trouble her.

Present condition: Extensive and deep infiltration of the whole of the left cornea only a thin strip at the circum--ference of cornea being left clear.There are no complications of iris or ciliary body.She can just distinguish fingers at six feet.

Treatment : Injection 2.c.c. of milk on the

4·th. Jan.

5·th. " The eye is better: the infiltration has cleared up in patches espe--cially in the supero-nasal quadrant

continued.

Vision is distinctly increased.

6·th. Jan. 2·nd.injection.Improvement continues

8·th. " 3·rd. " " "

9·th. " Infiltration only found in numerous isolated spots, the cornea between being perfectly transparent.

10·th. " 4·th. injection.

11·th. " Infiltration almost invisible.

12·th. " 5·th. injection.

14·th. " 6·th. injection. There remains a small infiltrated spot in the centre of the cornea visible only by oblique illumination. Vision 3/6.

18·th. " Discharged with above vision which will improve in a couple of months. **Continues treatment at home** putting in the eye every night ung.Hydrarg. Ox. Flav. Has to report in three months.

Case 25.

Juan G. A. 53 years. 1·st. consult.

21·st.Aug. 1922.

Present condition: Severe chronic trachoma with pannus, complicated by intersti--tial keratitis in both eyes.

Treatment:

21·st.Aug.1922. For over two months this patient was treated (s.a.) for his trachoma and pannus. The treatment was a success so far as the trachoma and pannus were concerned but a deep and dense infiltration of both corneas was left which reduced the vision to counting fingers at four feet, so it was decided to try if by milk inject. the condition could be improved.

29·th.Oct. 1·st. injection 3.c.c.

31.st. " 2·nd. " "

2·nd. Nov. 3·rd. " " . The infil--tration is not so dense and vision has increased to a slight degree.

4·th. " 4·th. injection.

6·th. " 5·th. " .Improvement continues.

8·th. " 6·th. injection.No more injections were given and patient was dis--charged to report in a week with--out any local treatment except dark glasses.

continues

16 th.Nov. On examination both corneas were found to be almost completely trans--parent .Vision 1/6
A great part of the diminished vision is due to irregular astig--matism in both eyes effect of some previous corneal ulceration in the course of his chronic trachoma.
He will be ordered glasses.

IRITIS AND IRIDO-CYCLITIS. Case 26.

Juana B. A. 38 years 1·st.consult.
18·th.Nov. 1921.

Present condition: History of acquired syphilis about 9 months ago and at this date presents marked secondary symptoms. About four months ago had suffered from an attack of retinitis and iritis in both eyes.Constitutional and local treatment were very imperfectly carried out. In spite of of deficient treatment there was improvement and she certainly to all all appearance was cured.She had not suffered from her eyes for about three months when she

18·th. Nov. consulted me on account of violent pain in the right eye which had begun about three days before. On examination this proved to be a severe irido-cyclitis with hypopyon.

Treatment: Atropine collyrium t.i.d. with inunction of Ung. Hydrarg.

19·th. Nov. Has passed a very bad night , suffering great pain. The pupil is semidilated : hypopyon unchanged. She was given an injection of 3.c.c. of milk and the atropine was stopped for the time in order to

continued

study the effect of the injection.

20·th.Nov. There is evident improvement; pain is less: pupil is fully dilated and there are no synechias. Hypopyon is less.Atropine collyrium was again ordered.

22·nd. " 2·nd. injection.

23·rd. " Pupil completely dilated.Pain is much less. Hypopyon has disappeared completely leaving anterior chamber transparent. Atropine was continued.

24·th. " 3·rd. injection.

26·th. " 4·th. "

28·th. " 5·th. "

3·rd. Dec. Eye is completely cured. Atropine was stopped and general antisyphilitic treatment continues to be carried out.

Case 27

Enrique R. A. 17 years 1.st. consult.

8.th.May 1924

Present condition: History of great pain in eye for about a week. On examination is found to have a severe irido-cyclitis with hypopyon.Vision nil. Wasserman negative.

Treatment : Hot fomentations: leeches to temple:

8.th. May Collyrium of Atropine and dionine 1 % . Intravenous injection of 1.c.c. of sol. Hydrarg. Cyanid.1 %

9.th. " Is a little better. Pupil is slight--ly dilated in the supero-nasal quadrant and he can distinguish fingers at a foot.

10.th. " 2 nd. injection cyanide.Improvement in condition of eye is very slight though in the upper part the cornea and anterior chamber seem clearer than on the previous day. He can today distinguish fingers at three feet.

11.th. " Has still a good deal of pain, especially at night.Aspirine was prescribed. Atropine was continued.

12.th. " 3.rd. injection cyanide.

14.th. " In spite of the atropine the pupil has dilated only in the supero-nasal quadrant.Cyanide was stopped and an

continued

injection of milk was given on this

14·th.May date. 3.c.c.

15·th. " Improvement is very evident. Pupil is more dilated and infiltration of iris is less .Has had no more pain and vision is fingers at twelve feet.

16·th. " 2·nd. injection milk. Improvement continues.

18·th. " 3·rd. injection milk.Improvement continues.

20·th. " 4·th. injection. Improvement is very marked. Vision 1/6

25·th. " Anterior chamber is clear and infiltration of iris has gone. There is left a posterior synechia in the supero-temporal quadrant.

Note : There was more improvement after first injection of milk than after six days treatment with injections of cyanide. Injections were stopped.Atropine was continued with , and on the

1·st. June eye was cured leaving only the above mentioned synschia.

Case 28.

Tomás S. A. 22 years. 1·st. consult.

14·th. Dec. 1925

Present condition: Very severe irido-cyclitis following pneumacoccal conjuncti--vitis . Vision nil.

Treatment: Collyrium Atropine + Quin.

14·th. Dec. Hydrachlor.

16·th. " No improvement.

1·st. injection milk 3.c.c.

18·th. " 2·nd. " " " .

20·th. " 3·rd. " " " . Very little improvement.

22·nd. " 4·th. injection.Pains continue.

24·th. " 5·th. " .

25·th. " Pains have disappeared and eye is better.

26·th. " 6·th. injection. Improvement continues and he can distinguish fingers at four feet. No more injections were given, but the Atropine + Quinine Collyrium was continued with.

14·th.Jan.1926. Eye cured. Vision about 1/6

Note. This was a very bad case and it is surprising that he recovered any degree of vision.

INJURIES AND POST-OPERATIVE INFECTIONS.

Case 29.

Juan A. A. 13 years. 1·st consult.

4·th. June 1923.

Present condition: This boy was cutting out scraps for his little sister, when by a sudden movement of her head, she struck his elbow and one of the blades of a very sharp pointed scissors penetrated the left eye-ball. On examination there was a small wound in the corneo-sclerotic junction and the anterior chamber was completely filled with blood, so that it was impossible at the moment to ascertain the exact extent of the injery, though manifestly it was serious.

Treatment: Patient was sent to bed. Fomentations 1 — 4000 Hydrarg. Cyanid. followed by Collyrium Atropine t.i.d. A light bandage was applied and 1·st. injection 2.c.c. milk.

4·th. June.

5·th. " Patient has not had much pain and the condition of the eye is much the same as yesterday. Same local treatment continued and boy was kept in bed.

continued

6·th. June. The injections were continued ~~were continued~~ on alternate days up to the

14·th. " when the 6·th. and last injection was given. During this time the fomentations and atropine had been continued and today he got up for the first time. During the previous three or four days the blood was getting rapidly absorbed and on this date the anterior chamber is clear and the condition of eye can be seen. The pupil is fully dilated. The lower half of anterior chamber is filled with swollen lens matter. The upper half of pupil is quite clear. The anterior capsule had been opened in the lower third by a transverse cut about 4 mill. long. The blood had come probably from a wound in the iris which is already healed. The boy was kept in his room. Fomentations were stopped. Atropine was instilled once a day and bandage was continued.

22·nd. June The lens has graduallymbeen absorbed and today there is only a little debris in the bottom of the anterior chamber. Atropine was stopped and bandage continued.

continued.

24·th.June. On this date the conditions are as follows: Pupil is semi-dilated. The anterior chamber and lens are perfectly transparent bar a white line at the site of wound in anterior capsule. Bandage was left off and boy was allowed to go out wearing dark glasses. No other treatment was used and he had to report himself in a week.

1·st.July. No scar visible in anterior ~~chamber~~ capsule or iris.Pupils are equal.Both eyes appear the same and by simple examination it is almost impossible to say which was the injured eye.

30·th. " The external appearance is the same as on 1·st. July.On ophthalmoscopic examination the fundus was normal and monocular vision was quite good using a 10.D lens.

Case 30

Isabel F. A. 22 years. 1·st.consult.

5·th.Dec. 1925.

Present condition: Came to consulting room with a French nail embedded in the eyeball The accident had happened a few minutes before.The point had enter--ed outer side of eye about three millimetres behind the corneo-sclerotic.junction and it was so firmly fixed that a pliers had to be used to extract it.It was found that the point of the nail had entered the posterior chamber for about a centimetre.It was impossible to see the fundus as the posterior chamber was filled with blood. She was suffering a good deal of pain.

Treatment:

5·th.Dec. 1925. Irrigation of conjunctival sac with sol. Hydrarg. Cyanid. 1 ___ 4000 : to be repeated twice daily,followed by instillation of atropine and eye to be bandaged. 1·st. injection of 3.c.c. of milk.

6·th. Dec. Has very little pain,otherwise the condition of the eye is the same.

7·th. " 2 nd. injection. Had a good night and pupil is fully dilated.

9·th. " 3 rd. injection.

continued

11·th.Dec. 4·th. injection. No more injections were given: irrigation stopped but atropine was continued once a day and eye kept bandaged. Posterior chamber is clearing.

13·th. " Today it is possible to distinguish the vessels of retina.

15·th. " Atropine stopped.Vitreous is quite clear and fundus appears to be normal. Bandage was continued and patient requested to return in a week.

22·nd. " Pupils are equal: vision on testing was found to be perfect and she returned to work on the 26 th. Dec.

Note: Anteriorly a reference was made to this class of accident which is common in the banana packing sheds.Often the eye is wounded,but this of course is an exceptionally severe case.The nail as a rule does not penetrate as the point is not very sharp.The nail in this case must have struck the eye with great force exactly perpendicular to the globe. In most cases the blow is glancing but causes quite severe wounds in cornea or sclerotic.

DACRYOCYSTITIS. Case 31

Pepito Q. A. 7 months 1.st. consult.
8.th.Feb. 1925

Present condition: Chronic dacryocystitis of right eye with profuse purulent discharge Otherwise the eye is all right.The mother says that child had this from birth but I suspect that the cause has been an infection from the maternal passages which started the usual conjunctivitis and the above condition was left.The mother was very anxious about it and some-thing had to be done.I did not think that excision of the sac was justified in so young a child.

Treatment: Mother had been irrigating eye for some time with sol. Hydrarg.Cyanid. 1 ___ 4000, and she was told to continue these irrigations four times a day as before and meanwhile six injections of milk 1/2 c.c. were given with the usual interval.

8.th. Feb.

12.th. " 3.rd.injection.The discharge is very much less about 1/3 what it was .

18.th. " 6.th.injection was given.The dis - charge has gone and mother was told to continue irrigations twice a day and to return in a fortnight.

4.th.March 1925 Eye seems perfectly well and irrigations were stopped.I saw the child six months after and it had remained cured.

SUMMARY.

The conclusions I have come to are the following:

That the subcutaneous injection of milk is an invaluable remedy for treating the septic lesions of the eye referred to in this thesis, viz-

Ulcerations of the cornea.

Acute and subacute keratitis.

Iritis and iridocyclitis.

Infected wounds of the eye.

That these diseases can be cured by the injection of milk more rapidly and with less subsequent disability than by any other treatment I have employed previously(Cases 15; 16, 17, 23, 27, 28.)

That the injection is also a very efficient prophylactic against infections of injuries of the eye.(Cases 29 and 30)

That the outstanding advantages are -

(1) Rapidity of action.(Cases 3, 9, 10, 14, 24.)

(2) Is the most certain remedy for quickly relieving ocular or periorbital pain.(Cases 1, 6, 8, 11.)

(3) Using the technique and doses indicated it is absolutely innocent of causing any serious immediate or after effects, i.e. It does not cause anaphylaxis or protein shock, nor are any after effects noted such as serum fever, etc.

(4) To apply it in case of urgency, it is not necessary to wait for the result of a bacterio--logical examination as it will be of benefit

continued

whatever the cause of the condition may be and precious time may be saved.

(5) Can be used simultaneously with appropriate local and general treatment.

(6) Its action is independent of the personal or home conditions of the patient. In the majority of these cases, the treatment had to be carried out in their houses, most of which are perfect hovels and hotbeds of infection of every description. This combined with their ignorance and want of personal cleanliness, makes it hopeless to think of trusting to any local treatment alone and expect to get satisfactory results. Using this treatment however, the eye can be saved in spite of everything.(Case 23)

(7) Simplicity of technique, not only in the application but also in the preparation of the injection.

(8) Has very few general contraindications. For example, it would not be prudent to use it in a patient with serious valvular lesions or in acute general tuberculosis.Apart from conditions such as those, it can be used with perfect safety.

(9) There is another advantage which though social rather than scientific, is of importance where (as in those cases) the majority of the patients are poor and are unable to afford the price of serums or the commercial preparations of milk such as caseosan, tetra-protein etc. As the cost of preparing the milk is infinitesmal, there is

continued

not the difficulty of carrying on the treatment which sometimes arises in those cases.

(10) In outlying parts of the world, it is sometimes impossible to get the preparations mentioned above, but milk can always be obtained and can be used in an hour.

I have made a trial of some of these preparations of milk and I have found that the fresh whole milk is more rapid in its action and in general gives more satisfactory results.

Though the action of the milk injection is non-specific, it is very valuable even in specific diseases, as the inflammatory process is arrested almost immediately, giving time for the specific remedies (which ought to be used simultaneously) to have their full effect.(Case 26.)

Bibliography.

Weichardt ____ Münch. Med. Woch. Jan. 23rd. 1920

Page 91.

Extracts from this appeared in

The Medical Annual 1921, Page 18

(Wright. Bristol.)

Though the scope of this Thesis is limited to recording personal observations I may be permitted to mention that two French oculists were using injections of milk in 1916. I have not had an opportunity of reading their reports but I understand that the results were very satisfactory. I give their names and that of the journal in which the articles were published.

Domec — Clinique Ophthalmogique. Sept-Oct-1917.

Darier - Clinique Opthalmogique. January 1917.

Finis.